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COMMUNITY CANNING CENTERS

By Mabel C. Stienbarger, Bureau of Home Economics, and
Miriam Birdseye, Office of Cooperative Extension Work
U. S. Department of Agriculture

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By Mabel C. Stienbarger, Bureau of Home Economics
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Miriam Birdseye, Office of Cooperative Extension Work,
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CANNING METHODS are in principle the same in a canning center as in home canning, but the problems that arise where wholesale quantities of food are handled are more like those of a canning factory. Many small centers operate successfully with home-size equipment or home-made devices, but the larger the scale of operations the greater the need for the kind of equipment, management and skilled supervision necessary to run an efficient commercial canning plant.

Directions for canning at home are given in detail in Farmers' Bulletin No. 1471, "Canning fruits and vegetables at home", published by the Bureau of Home Economics of the U. S. Department of Agriculture, and available free on request to the Department. The purpose of the present pamphlet is to supplement that bulletin with suggestions for meeting problems that arise in canning centers including the large scale canning by relief centers.

Acknowledgements for assistance in the preparation of this material are due to the State canning specialists, to the Bureaus of Plant Industry and Agricultural Engineering, U. S. Department of Agriculture, to the Federal Emergency Relief Administration, to the National Cannery Association, and to various manufacturers of canning equipment who have furnished information.

THE FIRST CANNING CENTERS were often the result of some neighborhood arrangement for use of the same canning equipment at a saving of time, labor, and fuel. Others were set up by local agencies and generally operated under the direction of extension workers to help conserve food after periods of emergency resulting from drought, flood, unemployment, or falling prices for raw food products. They were financed by county commissioners, school boards, civic bodies, planters, mill owners, factory managers, banks, or the American Red Cross. The canning center movement was accelerated by the wide-spread decrease in farm incomes and by progressive unemployment in towns and cities, which threw millions of people upon the relief rolls.

As the available local and State funds became exhausted, the burden of financing and equipping the centers, providing containers, and furnishing paid supervisors was assumed by the newly established Federal and State emergency relief administrations. In 1933 and 1934, a majority of the State relief administrations had organized comprehensive food production and conservation programs. These programs often involved more than one type of canning center, including the use of circulating equipment, the establishment of small community centers, and, as a climax, the setting up of numerous good-sized centers or plants as work projects. These plants were needed to process the products of large acreages cultivated as work relief projects, or to put up sizeable local surpluses of fruits and vegetables to be distributed through relief channels.

By far the most extensive of such enterprises were the meat canning plants established as work projects in the summer and fall of 1934 to process the cattle purchased in connection with the drought relief program and turned over to the Federal Relief Administration. The many thousands of canning centers of various types organized on relief funds have turned out in the aggregate millions of cans of vegetables and meats.

It seems likely that a somewhat new development of the relief canning program in 1935 will be the establishment of canning centers for rural rehabilitation and subsistence homestead groups, often as a part of the so-called "community work centers." The dual purpose of such canning centers will be to conserve efficiently the products raised by the group, and also to bring some income by canning on a toll basis for families outside the group, or by exchanging excess canned products for other needed goods.

The canning center is definitely an educational as well as a relief enterprise. It teaches not only methods of canning and other forms of food preservation, but also lessons in sanitation, personal hygiene, the budgeting of the home food supply, and group and community cooperation.

THE SET-UP for the canning center varies with the purpose and the locality. Under a neighborhood cooperative arrangement, families often pool the equipment which they individually own, each family canning its own food materials. In other places the county owns equipment which is moved from place to place as needed, for use under supervision of the home demonstration agent or of leaders trained by her. Some counties have traveling canning kitchens, consisting of retorts and a boiler mounted on a chassis and sent around with a trained worker in charge. Every county in the State of Oregon has traveling equipment.

More common, however, is the center with stationary equipment. A building may be especially designed and erected at small cost, but more often space in existing buildings is fitted up for the purpose. Another possibility is to secure the loan of a local canning plant which normally cans a few products during a limited season, or to enlarge the staff and equipment of local plants to process the products of home or community gardens at contract prices.

THE FINANCING of the canning center must, of course, be arranged before any plans can be put into operation. Housing the activities, purchase and installation of equipment, and provision for repairs, containers for the food, and the salary of a trained supervisor are the first and usually the most serious problems encountered.

The cost of containers is much less for dried or pickled products than for canning. Corn, pumpkin, squash, nearly matured peas and beans, as well as many fruits, can be successfully dried. Cabbage, turnips, and string beans, as well as cucumbers, can be brined or "krauted". (See Farmers' Bulletins 984, "Farm and home drying of fruits and vegetables", and 1438, "Making fermented pickles", also publications by State agricultural colleges on drying and brining fruits and vegetables.) Storage of vegetables, also, proves an economy. Information on the storage of vegetables, including late beets, late cabbage, carrots, late celery, onions, parsnips, potatoes, and others is given in Farmers' Bulletin 879, "Home storage of vegetables". Farmers' Bulletins may be obtained free upon request.

MANAGEMENT OF THE CENTER

COMPETENT SUPERVISION is absolutely essential to the success of a canning center. If untrained persons are assembled to work with perishable foods, and to use unfamiliar equipment, without expert guidance and control, there is certain to be waste of material and time, and possible menace to health. This is especially true where nonacid vegetables and meats are canned. The State supervisor of relief canning, the county home demonstration agent, the local home economics teacher, or some other local person trained in home economics, or experienced in commercial canning, should be consulted or made responsible for planning, equipping, and operating the center, and should be asked to train or to approve the appointment of suitable persons to oversee the canning.

FOR SMALL CENTERS, the home demonstration agent frequently trains, and in any case approves the selection of experienced women to work in teams on a volunteer basis on specified days; or she approves and supervises experienced workers who are paid from relief funds.

LARGER CENTERS require a regular staff, including both supervisory and operating groups. The personnel of some of the larger meat canning plants include, besides the canning force, a plant supervisor, building superintendent, time keeper, engineer, linen clerk and nurse, working under general supervision of a State canning specialist assigned by the State Relief Administrator.

When foods are being canned in quantities of several thousand cans per day it is necessary to use commercial practice in handling and processing. The canning plant should be operated under the supervision of a person with commercial experience who is informed on methods of handling the products in large quantities.

Trained crews, as well as trained supervisors, are considered necessary in the larger centers, to prevent damage to the equipment by inexperienced handling and to insure safe products. In such cases there may be several trained crews working in rotation, with preference to employment of relief recipients, and none but the trained crew operating the machinery. The other workers are assigned to the jobs of preparing the food for canning.

DAILY RECORDS are needed, whatever the type of center. They will differ, of course, according to the type of center, but the following are suggested as generally useful for the smaller centers.

Kitchen appointment blank, by communities and/or families.

Family canning record showing the date when the center was used by each family, number of members using, hours spent, and products prepared, classified according to

Product: Kind; owned or furnished.

Containers: Glass, number and size; tin, number and size, owned or furnished; processing method used; number containers taken home; number left for center.

Production record (wall size) showing dates, number of persons using the center, kind of products prepared (fruits, vegetables), total number containers of each; number glass and tin containers used, respectively; number of containers taken home by workers; number left for center.

Cost records of products, supplies, containers, and other equipment purchased for the use of the center and of needed repairs; also of time spent by manager and by paid or volunteer assistants.

RELIEF CENTERS serving local communities should keep additional records, including data such as will probably be collected by the employment or welfare agencies and turned over to the manager of the center. Such records should include a -

Registration file showing name, community, and post office address of persons on relief rolls served by the center, with any desired information on family make-up. There should be space on the back of this card or on a separate card for estimating the family canning budget and recording the total number of containers needed, empty containers at home, and additional containers required.

NOTICES POSTED in appropriate places at the canning center have been found to save time and misunderstanding. The following, to be set up in large print, are suggested:

Schedule for center: working days; hours; days assigned to each community.

State sanitary regulations for canning plants, and all special regulations.

Directions for operating cookers.

Time-tables for processing.

Rules for care of equipment.

Rules for cleaning and care of waste.

Sample canning budget.

Statement of toll to be levied for use of equipment.

TOLL, in the form of a percentage of their finished product, is usually charged where families bring their own produce to the center for canning. The toll in 1934 under the Texas cooperative plan for community canning, on the basis of experience in 1933, is given in Table 1, page 5.

It is less expensive, of course, to can large quantities of food than small ones, and the toll is less. Where families pool their produce for canning at the same time, they save on toll charges.

ARRANGEMENT OF SPACE FOR WORK AND EQUIPMENT

The canning center serves a vital need, but its purpose has usually been more or less temporary. The object usually is to conserve food, utilize spare hands or provide employment, and save money under present conditions, rather than to conduct a permanent enterprise for profit. The probable life of the project should be considered in planning and equipping the center.

Table 1.- Suggested toll for canning in cooperation with relief agencies ^{1/}

	Relief receive	Producer receive	Owner of equipment receive
With relief furnishing: a. equipment b. cans c. labor	Vegetables 55% Meats 40%	Vegetables 45% Meats 60%	
Producer furnishing: a. products			
With relief furnishing: a. equipment b. cans	Vegetables 45% Meats 30%	Vegetables 55% Meats 70%	
Producer furnishing: a. products b. labor			
With relief furnishing: a. equipment			
Producer furnishing: a. cans b. products c. labor	Vegetables 15% Meats 20%	Vegetables 85% Meats 80%	
With relief furnishing: a. equipment b. labor	Vegetables 35% Meats 30%	Vegetables 65% Meats 70%	
Producer furnishing: a. cans b. products			
With relief furnishing: a. cans b. labor	Vegetables 45% Meats 30%	Vegetables 45% Meats 60%	Vegetables 10% Meats 10%
Producer furnishing: a. products			
Equipment individually owned			
With relief furnishing: a. cans			
Producer furnishing: a. equipment b. labor c. products	Vegetables 30% Meats 20%	Vegetables 70% Meats 80%	

^{1/} Texas Relief Administration and Texas Agricultural and Mechanical College cooperating, 1934.

Accordingly, while some canning centers occupy buildings especially designed for the purpose, in most cases existing rooms, sheds, or other structures are adapted. Certain steps, like washing products, heating water, and processing, may even be carried on out of doors. On the other hand, some of the larger centers occupy buildings formerly used as creameries, laundries, or factories of some kind, easily fitted up for canning purposes. Every center is in fact an individual problem.

When an old building is used for a canning plant it should be thoroughly inspected by a competent person to determine whether it is safe from sanitary and structural standpoints.

ESSENTIAL for every center are plenty of pure water, thorough screening, good lighting, ventilation, sanitation, proper disposal of waste water and garbage. Conditions should determine, however, whether it is wiser to provide several cookers of household size, and other equipment which can later be used in the home, or to set up hotel or factory-size retorts and other large-scale equipment, which have greater capacity but may fall into disuse when the emergency passes. While equipment must be adequate and safe, ingenuity and local craftsmanship can sometimes produce effective and inexpensive substitutes for commercial devices.

SANITARY toilet and hand-washing facilities and space for wraps must also be provided, and other pertinent requirements of the State Sanitary Code must be met.

OPERATIONS for which even the smallest canning center should make provision are the following:

- Receiving and checking products to be canned.
- Keeping records.
- Removing and disposing of husks, stems, and other gross waste.
- Washing products to be canned.
- Washing glass jars, tin cans, cooking equipment, utensils, towels.
- Heating water.
- Grading and preparing products, disposing of waste.
- Sterilizing glass jars, if open-kettle method is used.
- Scalding or precooking products to be canned.
- Marking tin and glass containers before processing.
- Filling products into containers.
- Sealing (for tin cans).
- Processing in pressure cooker (nonacid products); in water bath (fruits and tomatoes).
- Cooling tin cans in running water, if possible; glass jars in air out of draft.
- Cleaning and labeling finished products.
- Storing - supplies, equipment, finished products.
- Cleaning up, inside and outside.

WORKING SURFACES with the following measurements are recommended:

- Height for standing work, 34 to 36 inches.
- Height for sitting work, 27 to 28 inches.
- Knee room, 6 to 8 inches.
- Height of tables may be easily adjusted with wooden blocks.

ARRANGE EQUIPMENT to save steps and avoid cross-travel. Plenty of water, and generous heating surface and work space pay for themselves by expediting the canning process and saving fatigue.

PROCESSING TIME-TABLES from a reliable source should be posted over the cookers. This and every other precaution should be taken to insure safe processing especially of the non-acid foods, which if not adequately sterilized may cause botulinus poisoning. Farmers' Bulletin No. 1471, "Canning fruits and vegetables at home", prepared in the U. S. Bureau of Home Economics and including a time-table, may be obtained free on request to the U. S. Department of Agriculture, Washington, D. C. Directions for canning meats will be furnished on request to the bureau of Home Economics.

STORAGE for the canned foods should be provided in a cool, dry place. Protection from light is necessary for foods in glass jars.

FOR ILLUSTRATION of possible cannery set-up and suggested arrangement of equipment see figures 1, 2, and 3. Examples of canning center types in operation last year are the relief canning center at Norfolk, Nebr. (cover page); floor plan of community canning kitchen at Durham, N. C. (fig. 6); a federal canning plant located at Waco, Texas (fig. 8); portable canning equipment, New Mexico (fig. 9); and portable canning equipment, Tacoma, Wash. (fig. 10 and 11).

EQUIPMENT

FUEL of many sorts is used, of course, to furnish the heat for canning operations. Wood, coal, kerosene, gasoline, gas, or electricity are found most economical or convenient according to local resources.

STEAM under low pressure, where available, proves a great convenience. Some canning centers are located in buildings previously occupied by other activities which required a boiler for generating steam under low pressure. Other centers have set up a steam boiler or been able to pipe steam in from nearby sources.

Steam may be used to provide hot water for general purposes. It may be used for heating water baths and pressure cookers for processing. (See Fig. 2) Large pressure cookers or retorts are heated most satisfactorily by steam under low pressure. When a series of retorts is connected with a single steam line, the installation must be made by a competent engineer experienced in this type of steam fitting, otherwise difficulties may arise in the operation of the retorts.

SPECIAL HEAVY DUTY BURNERS are required for gas or oil if steam is not available for heating the larger pressure cookers or the retorts. Otherwise there is too much delay in getting the pressure up for processing. Heavy duty burners equipped for burning oil or gas, also tanks of the fuel, are sold by some manufacturers of canning equipment. Iron frames for supporting the cookers over the burners may also be obtained from the manufacturers or they can be made by a blacksmith. The iron (3" x 3" angle iron) is forged into a

ring with the inside diameter of the cooker. Four legs made of the same kind of iron are bolted tightly to the ring. A horizontal "foot" of 2 or 3 inches may be made on each leg.

STEAM PRESSURE COOKERS, or retorts, are needed for processing meats and nonacid vegetables. This means all vegetables except tomatoes, rhubarb, and ripe pimientos. The 25 to 30-quart sizes of pressure cookers are suitable for both household use and many of the canning centers. Cookers larger than this are too heavy for a woman to lift, and will necessitate the assistance of a man unless they can be left stationary.

Cookers holding 40 to 90 quarts liquid measure and holding from 25 to 48 No. 2 cans are commonly referred to as hotel or institution sizes; cookers from these sizes up to 150 No. 2 cans capacity are "miniature retorts", while cookers larger than this are factory sizes with capacities from a few hundred to more than 2000 cans per load. (For cooker dimensions and capacities see table 2, below, and table 5, page 13.)

Pressure cookers and retorts must be strongly constructed to withstand the strain of usage. They must be steam-tight or very nearly so to maintain pressures steadily. Each must be fitted with a steam pressure gauge, petcock, and safety valve, or combination of petcock and safety valve, and should also be fitted with a thermometer. If the thermometer is lacking, as too often happens with the cooker of household size, one may be fitted on.

Table 2 -- Approximate dimensions and capacities of steam pressure cookers

Size	Diameter	Height	Net Weight	No. 2 tins	No. 3 tins	Pint jars	Quart jars
Quart	Inches	Inches	Pounds				
10	9-1/2	12	12	6	2	5	3
18	12	14	18	14	8	8	5
25	13	15	27	16	10	18	7
30	14	15	35	19	12	20	8
40	15	15	50	25	16		
90	18	18	140	48	30		

The gauges on pressure cookers often get out of order. This is because the indicator is held in place by friction only and its position may shift, causing the gauge to register higher or lower than the correct reading. A pressure gauge having the indicator attached to the stem in some permanent manner, as by soldering, is less subject to change.

IN OPERATION AND CARE of the pressure cookers follow directions of the manufacturer and post the instructions for the benefit of the workers. Certain points, however, need special emphasis:

1. Test the gauges at the beginning of the canning season, and frequently thereafter. If a reliable master gauge is available, the test can be made by removing the petcock, or safety valve. Screw in the master gauge and run up the pressure while comparing the two gauges. It is not necessary that the air should

be exhausted from the cooker for this test. If an error of 1 and 2 pounds is found, an allowance can be made for it in processing. If the error is as much as 3 pounds, the gauge should be replaced by a new one. Such repair parts can be obtained from the manufacturer. A paste of glycerine and litharge, such as plumbers use, may be put over the threads before screwing in any attachment on the pressure cooker top. This will make the closure steam-tight.

Another method of testing the gauge on a pressure cooker is by use of a maximum thermometer ^{1/} of suitable range (100°-300°F.). Place the thermometer in a container that will hold it in an upright position in the cooker. Run the pressure up to the lowest point that will be required, in canning usually 10 pounds. Return the pressure to zero, open the cooker, observe the thermometer, shake down the mercury, and start again. Run the pressure up 5 pounds higher, to 15 pounds, and again observe the thermometer. Gauges sometimes show an error of about 1 pound at 10 and 2 pounds at 15.

Pressures and corresponding temperatures are as follows:

5	pounds	pressure,	227°F.
10	"	"	239°F.
15	"	"	249°F.

Manufacturers of pressure cookers and retorts will check the gauges if they are removed and returned to the factory. Or the whole lid may be returned for checking of all the attachments. This should always be done at the beginning of the season, and may be done at other times.

2. Add sufficient water to the pressure cookers to prevent their going dry during processing. Replenish the supply of water after each load of containers has been processed. Pressure cookers may be ruined by continued heating while dry; also, the temperature will run up excessively.

3. Exhaust or vent the air from pressure cookers before processing, or the pressure used will be partially air pressure and the temperature will fall short of the required degree. A steady flow of steam emerging from the petcock for 7 to 10 minutes will exhaust cookers of household size. Follow the instructions of the manufacturer for larger retorts.

4. Protect pressure cookers from drafts during processing, as drafts may cause fluctuation in pressure.

5. Do not loosen the cover of a pressure cooker after processing until the steam gauge registers zero, and the petcock is open with no steam coming from it.

6. When opening the pressure cooker tilt the cover so that the steam emerges away from the operator.

7. Do not hasten the cooling of a pressure cooker by applying cold water or wet cloths, or by placing it on a cold surface. To do so may crack the cooker.

^{1/} May be purchased from the Taylor Instrument Companies, Rochester, N. Y.

8. Wash pressure cookers after using. Keep the surfaces which form the closure between pot and cover clean. This will reduce the tendency of the cover to stick after processing. Use care not to dent or roughen these surfaces. Do not use an abrasive on them. New pressure cookers sometimes leak steam slightly at this junction, but after heating several times the surfaces should adjust to make the closure tight.

9. Keep the safety valve in good working condition by keeping it clean. If it is a valve of a ball and socket type, wash it each day after using. A safety valve which fails to operate properly may cause an accident.

10. Use a tooth pick to keep the opening of the steam gauge clean. Do not immerse the steam gauge in water.

11. Correct for altitude when processing by adding 1 pound pressure for each 2,000 feet above sea level.

WATER BATHS, boiling tanks or vats of many types are in use for processing the acid foods - fruits, tomatoes, rhubarb, ripe pimientos and pickled beets. Some suggestions for improvised boiling vats are shown in Figure 7. Or tanks with covers may be made from galvanized iron. Commercial water-bath cookers are also obtainable in a variety of sizes.

These vats must be deep enough to permit covering the food containers with at least an inch of water. After filling, the glass jars or tin cans are placed on a rack in the bath with space between for circulation of water. Tin cans may be placed in two or more layers. Cover the vats with lids to hold in steam.

Table 3 -- Capacity of Water Baths

Dimensions	No. 2 cans		No. 3 cans	
	Each load	Daily (10 loads)	Each load	Daily (10 loads)
25" x 30" x 8"	52	520	30	300
25" x 60" x 8"	105	1050	60	600

TANKS, vats or other containers for washing the food products, blanching or parboiling them, and for cooling tin cans are used in a variety of materials. Galvanized iron is probably lowest in cost. Blanching baskets of wire, braced with galvanized strips, and perforated galvanized buckets are used also.

No acid food with cut surfaces should be allowed to remain in contact with or should be cooked in galvanized iron.

A LYE BATH, in an enameled iron or alberene tank fitted with a steam coil, is useful when large quantities of peaches or sweetpotatoes are being packed. Commercial concentrated lye in 8 to 10% solution is heated to 140° F. for dipping the fruit or vegetable. (See directions for canning peaches in Farmers' Bulletin No. 1471) The lye solution must be removed by very thorough washing.

IN SMALL CENTERS where a variety of products must be handled on the same day from a number of home gardens, several small cookers ranging in size from 25 to 30 quarts in capacity permit a flexible schedule and save time and heavy lifting. The items of equipment desirable for canning centers with a capacity of 250 to 750 No. 2 cans per day are suggested in table 4 on page 12. This list is quoted almost entire from a report of the Illinois Extension Service on canning centers planned for handling the products of good sized community gardens. A few modifications have been made.

Additional suggestions for equipment of the small center are rollers for tables, floor truck or wheel cart, clock, and cleansing equipment. For suggestions as to table surfaces see page 13.

THE LARGER CANNING PLANTS are equipped with retorts, exhausters and sealers as suggested in Table 5, page 13. The general plan for equipping these plants can be expanded to meet a particular case by adding more retorts, blanching tanks, exhausters and sealers to give the desired capacity. The drawing shown in Fig. 3, a floor plan for a canning plant of 1,000 to 2,000 cans per day, suggests the placing of the equipment, and the routing of the work for this moderate production. In this layout it is necessary to have lighting from above. If this cannot be provided, the work tables should be shifted to positions along the outer wall where windows are located.

A canning engineer, or competent person with commercial experience should be consulted regarding the equipping of canning plants to produce several thousand cans of food per day. In this scale of production special attention must be given, also, to the location of the plant, water supply (and possibly water softening), sanitation, drainage, and warehousing.

Other items include scales, clock, work tables, washing, blanching and lye-dipping tanks, tank for water bath processing, cooling tank, truck or trucks, portable derrick for lifting cans into and out of the retorts, an extra set of retort baskets for each retort, boiler, steam line, small equipment such as knives, and cleaning equipment. The last should include a rubber hose as well as broom, mop, soap and cleansing powders.

In one meat-canning plant, a pressure pump equipped with special cleaning guns using boiling water is employed to wash everything once a day. Concrete floors built to drain may be painted with floor enamel to facilitate cleaning. Walls and ceilings of painted wood may be washed easily with hose or pressure pump.

Where considerable grease must be disposed of, as in meat canning, special sewage grease traps should be provided.

Provisions must be made for the washing of tin cans. The cans should be washed before they are filled (keep lids dry) and again before labeling if they are greasy. The grease should be removed preferably before processing. Unless the cans may be washed in one of the tanks used for other purposes, another tank or a sink must be provided for this purpose.

Uniforms for the workers are desirable especially in the larger centers where greater caution is required to maintain sanitary conditions. Laundering of uniforms should be arranged for outside the canning center.

Table 4.--Number of workers and items of equipment required for canning centers of different capacities 1/

Item	Two 40-qt. steam pressure cookers	Four 40-qt. steam pressure cookers, or 1 retort and 2 cookers	Six 40-qt. steam pressure cookers, or 2 retorts
Number of workers <u>2/</u>	7	10 to 14	15 to 20
Capacity, 8-hour day <u>2/</u>	250 No. 2 cans	500 No. 2 cans	750 No. 2 cans
Equipment necessary:			
Stoves	4 to 6 burners	6 to 8 burners	8 to 10 burners
Sinks	2	2	2
Table space	----- 4, each	approximately 4 x 10 feet	
Tin can sealers	1, hand	---2 hand or 1 electric	-----
Buckets	2	3	4
Tubs for cooling	1 or 2 small	3	4, or large tank
Shallow pans (6 qt. or larger)	6	6 to 10	10 to 15
Dish pans	2	2 or more	2 or more
Kettles, for heating water	1 (2-3 gal.)	1 (4-5 gal.)	1, (5-10 gal.) or automatic heater
Kettles, for precooking	2 (12 qt.)	3 (12 qt.)	4 (12 qt.)
Wire baskets, colanders	2	2	2
Funnels, can fillers	2	2 or more	2 or more
Ladles or dippers, hook on handle	3	4	5
Can lifters, tongs	2 pair	4 pair	6 pair
Measuring cups	1 (1 cup) 1 (1 qt.)	2 (1 cup) 2 (1 qt.)	2 (1 cup) 2 (1 qt.)
Paring knives	4 or more	6 to 8	10
Long-knives (heavy)	2	2	2
Forks	2	2	2
Tablespoons	2	4	6
Long-handled spoons	2 (1 wooden)	3 (1 wooden)	4 (1 wooden)
Teaspoons	2	4	6
Brushes for vegetables and cleaning	3 each	6 each	8 each
Scissors (to cut beans)	2	4	6
Thermometer	1	1	1
Dish towels	4 daily	6 daily	8 daily
Hand towels <u>3/</u>	-----1 for each worker daily	-----	-----
Wash basins	2	4	6
Pot holders or gloves	6	10	15
Scales	1	1	1
First-aid equipment	1	1	1
Garbage containers			
Clock			

1/ Adapted from Illinois Extension Service.

2/ Approximate.

3/ Paper towels may be better.

Table 5 -- Main equipment suggested for large plants

Capacity (No. 2 cans nonacid products per day)	Retorts (8 loads per day)	Exhausters	Sealers
1,000	3-90 qt. pressure cookers; or 1 miniature retort (capacity 144 No. 2 cans each load)	Galvanized tank or exhaust box	2 or 3 heavy duty hand sealers or 1 semi-automatic power sealer and 1 hand sealer
2,000	2 miniature retorts	" "	3 to 5 heavy duty hand sealers or 1 semi-automatic power sealer and 1 hand sealer
3,000	3 miniature retorts	" "	1 semi-automatic power sealer and 1 hand sealer
5,000	Standard factory size retorts	Exhaust box	2 semi-automatic power sealers

WORK TABLES should provide 2 1/2 to 3 feet of working space for each individual. Metal coverings make for sanitary conditions, and removable sheets of galvanized iron have been used in some plants that pack meats. Where acid vegetables and fruits are being handled wooden table tops of pine, birch, fir, or redwood, given a couple of dressings with an acid-and alkali-resistant dressing, are satisfactory. Almost any sort of tabletop can be made satisfactory by covering it with heavy linoleum fastened down with large-headed nails. This can be scrubbed with cleaning solutions and will last a season or two before renewal is necessary.

Table tops may be made to drain by sloping each side of the working surfaces a little toward the center. The central trough then may lead to garbage cans, tubs, or other waste disposal. Shelves or tracks for cans may be built over the center of the table. An upper sloping track will carry empty cans by gravity, while the filled cans may be pushed along a lower track toward the sealers.

GALVANIZED IRON, used for table tops, lining of trucks, tubs, lug boxes, etc., contains a good deal of zinc. When cut surfaces of food lie in contact with galvanized iron they gradually absorb zinc, which in any considerable quantity is harmful. Do not allow meat to lie in contact with galvanized iron for more than 30 minutes. Cut surfaces of acid foods should not be placed in contact with galvanized iron.

COPPER OR COPPER-LINED utensils may be used safely for cooking fruit and vegetable products, provided the utensils are kept bright and shiny so that no copper salts accumulate to be removed by the food, and provided the food is removed from the copper utensils at once after cooking. Avoid the use of copper utensils for meats. The copper may cause discoloration.

WOODEN SURFACES must be given special care in cleaning, or they may become infected with trouble-making bacteria. Scrub these surfaces with soapy water to remove dirt and grease, and follow with scalding water or steam. Hypochlorite solutions (calcium, sodium, or potassium hypochlorite) are excellent for disinfecting wooden surfaces. They should not be applied until after soap and water have been used for cleansing, or they may lose their strength to disinfect.

Other canning utensils, made of retinned metal; of non-corrosive metals such as aluminum, monel or Alleghany, or enameled ware, require no special treatment but should, of course, be thoroughly cleansed.

TIN CANS

There are advantages in using tin cans rather than glass jars at the canning center. The initial cost is less. Heat penetration is better, therefore the processing period is generally shorter and more containers can be processed in a given time. No loss of liquid occurs in processing tin cans, as may occur with glass jars, and the cans may be water-cooled, which means less danger of over-cooking than might occur during the slow cooling necessary for glass. Tin cans are also easier to handle and transport.

It is cheaper to buy cans in lots of 1,000 or more. Defective cans or "seconds" of any description should never be used. In large lots, the number of defectives should not run more than 2 to 5 in a thousand.

ORDERS FOR CANS should specify:

- (1) Kind of can -- i.e., regular open-top cans of standard construction
- (2) Finish -- plain tin or enameled
- (3) Size -- No. 1, No. 2, No. 3, etc.
- (4) Type of gasket -- paper or rubber

PLAIN TIN CANS are made of thin sheet steel plated with tin. The usual type of plating is called "coke plate". Unless otherwise specified, this is the type of can supplied on order. Plain tin cans are satisfactory for most of the vegetables and fruits, and for most meats. Some foods, however, change color in the ordinary tin can, because of chemical reaction due to the metals of the can. This change does not affect the wholesomeness of the food, but it does affect the appearance, and such foods are usually put up in other kinds of containers -- enameled cans or glass.

ENAMELED-LINED CANS have come into use for certain products to preserve better appearance of the food, or to prevent corrosion or excessive darkening of the cans. The enamel is of two kinds -- "C-enamel" and "R-enamel", which is called also "sanitary enamel".

The products for which enamel lined cans are most commonly used and are most desirable are the following:

<u>Product</u>	<u>Interior finish of can</u>
<u>1/</u> Corn, cream style (to prevent darkening)	C enamel
Succotash	C enamel
Red colored fruits, including most berries, also cherries, currants, and plums (to prevent fading of color)	Sanitary or R enamel
Beets (to prevent fading of color)	Sanitary or R enamel preferred
Pumpkin and squash (to prevent corrosion)	C enamel may be used Sanitary or R enamel preferred C enamel may be used

"C enamel" cans should not be used with acid foods like fruits, tomatoes, or sauerkraut, nor with meat or other products when these contain much fat. Acid or fat may cause "C enamel" to peel off and make the product unsightly, even though harmless.

Plain tin cans are used for many meat products and C enamel cans with others to reduce the formation of black sulfide of iron. Fat may cause C enamel to peel off. A special meat formula C enamel is used for a few products, but it is not generally available. Special non-oil soluble gaskets may be obtained for meat canning.

THE USUAL SIZES of cans for home use are No. 2, No. 2 1/2 and No. 3. The larger sizes, No. 5 and No. 10, are usually intended for hotels and institutions. The dimensions, average net weight, and equivalents in cupfuls of the common sizes are shown in Table 6, page 16, together with the products usually put up in the given sizes.

1/

Whole grain corn, which keeps the flavor of fresh corn more nearly than cream style corn, may be canned more easily. It is not so difficult to process, and it may be successfully canned in plain tin. For this reason, directions are given here, as follows:

Use only tender sweet corn which has been freshly gathered. Shuck, silk, and clean carefully. Place in boiling water and leave 4 to 5 minutes at simmering temperatures. Cut from the cob deeply enough to remove most of the kernels without objectionable hulls. Do not scrape the cobs. Add 1 teaspoon of salt, and 2 teaspoons of sugar to each quart of corn, and half as much boiling water as corn by weight. Reheat to simmering, and pack into containers at once. Process immediately. C enameled cans or plain tin may be used. At 240° F., the processing time is as follows: No. 2 cans, 50 minutes; No. 2 1/2 cans, 60 minutes; No. 3 cans, 65 minutes; pint glass jars, 60 minutes; quart jars, 70 minutes.

Table 6 - Common sizes, capacity and use of standard cans.

Can size	Dimensions (inches)	Average net weight of contents (ounces)	Contents (cupfuls)	Common use
No. 1	2-11/16 x 4	11	1-1/3	Fruits and vegetables in small quantities
No. 1 tall	3-1/16 x 4-11/16	16	2	Soups, meat products
No. 2	3-7/16 x 4-9/16	20	2-1/2	Corn, peas, green beans, fruits, meats
No. 2-1/2	4-1/16 x 4-11/16	28	3-1/2	Fruits and vegetables west of Rocky Mts.
No. 3	4-4/16 x 4-14/16	33	4	Fruits, pumpkin, tomatoes, meats
No. 5	5-2/16 x 5-10/16	3 lbs. 8 oz.	7	Hotel and institutional use
No. 10	6-3/16 x 7	6 lbs. 10 oz.	13	Hotel and institutional use

THE TYPE OF GASKET to be purchased depends, according to most manufacturers, upon the sealing machine used, and the care and intelligence with which it is maintained and operated. When a good sealer is properly used the rubber gasket is preferred because it permits a closer double seam on the can. It often happens, however, in home and community canning, that the sealing, either because of the machine or the operator, is not under uniformly good control. For this reason paper gaskets are more often recommended.

With the paper gasket, the seaming rolls of the sealer may be a little looser, because the paper gasket is thicker than the rubber compound. Paper gaskets make a better seal also when reflanged cans are used. Some disadvantages of the paper gaskets are that they must be kept dry, they sometimes drop out of the cover, and they may wrinkle if wet or imperfectly adjusted, and thus cause a faulty seal.

HEADSPACE, between the food and the top of the can, is measured from a straight edge across the top of the can. This headspace is needed for expansion of the food during processing, and to prevent bulging of the cans with changes of temperature and altitude afterward. Filling a can too full also interferes with sealing or may result in a bulged can. But too slack a fill, leaving too much headspace, leaves too much air in the can and may cause rusting of the can or discoloration of the top layer of food during storage.

For home and community canning of most foods where tin cans are used the following allowances are recommended, although headspace varies some for different products:

No. 1 cans.....	1/4 inch headspace
No. 2 cans.....	5/16 inch "
No. 3 cans.....	3/8 to 1/2 inch headspace

Since the cover of the can goes 1/8 inch into the can, the actual headspace is less after the cover is sealed on.

In canning meat, the salt should be put in the can before filling, so it will dissolve in the broth and there will be no corrosion. If put on top of the meat after the can is filled, it may cause rusting of the lid.

EXHAUSTING, or driving the air out of the food before sealing is a step in the canning process that often proves troublesome at canning centers. It is done either by blanching or parboiling the food before it is packed into the can (the hot-pack method) or by heating the can after it is packed with uncooked food. In either case, the can is sealed at once while the food is hot and the headspace is filled with steam. Then when the can cools after processing a partial vacuum is produced in the headspace. Driving out the air improves the keeping qualities of the food, tending to preserve better flavor and color.

The sealing temperatures (temperature at center of can at time of sealing) necessary to insure satisfactory vacuums range from about 125° to 190° F. varying with the nature of the product. For those foods which heat penetrates easily, the sealing temperatures may be from about 125° to 150° F. But for other products such as cream style corn, pumpkin and squash, which heat penetrates slowly, sealing temperatures should be 180° to 190° F.

THE METHOD OF EXHAUSTING foods will depend upon the kind of products handled, and the equipment and time available.

When foods are precooked outside the can they should be packed at once at the end of the blanch or parboil and the cans sealed without delay while the food is steaming hot. Precooking outside the can shrinks the material and makes it possible to pack the food more closely into the cans without cramming than is possible with the raw material. Also, with some foods, considerable time may be saved by cooking them before packing.

Fruits and vegetables when packed cold into cans should be given an exhaust in steam or boiling water. This may be done by placing the filled but open cans in a bath of boiling water deep enough to come within 1-1/2 to 2 inches of the tops of cans. It is important to have steam above the cans, hence the water should be boiling when the cans are set into it, and the bath should be covered. Timing may start when the space above the cans is well filled with steam. Water from the bath should not be allowed to bubble into the cans. Immediately after the exhaust, the cans should be sealed.

AN EXHAUST BOX is necessary for canning large quantities of food without precooking. It can be purchased, or it can be constructed as suggested in figure 4 from galvanized iron, if the services of a good mechanic are available. A travelling belt carries the cans through the box. A steam line on each side of the cans placed about one inch above the bottom of the box has openings at 2-inch intervals. These send jets of steam obliquely against the sides of the cans. The bottom may be hinged so that the box can be opened for cleaning.

A box of this kind is used not only for the exhausting process, but, when the food is precooked, to coordinate the filling and sealing of the cans and keep the food from cooling before it is sealed.

Table 7 - Exhaust period at 212° F. for products commonly packed without precooking.

Product	Can Size	Pack	Exhaust Time
Asparagus	No. 2	Filled tight, hot brine poured over to cover	4 to 5 minutes
Tomatoes	No. 2 and No. 3	Packed cold, with or without juice added	5 minutes or to an internal temperature of 140° F. to 150° F.
Fruits	No. 2 and No. 3	Packed with hot sirup poured over	10 to 15 minutes, or to an internal temperature of 130° to 140° F.

When meats are packed into cans without precooking they should be exhausted to an internal temperature of 170° F., or until the meat is steaming hot and the color of raw meat has almost or entirely disappeared. If the exhausting is done with a water and steam bath without pressure as above described, 40 to 50 minutes may be required.

In some relief canning plants time has been saved by exhausting meats as follows: The filled cans are placed in tiers of alternating positions in a retort. A circular metal plate is placed over the top tier for protection. Application of 240° F. (10 pounds pressure) for 10 to 15 minutes heats the meat to a temperature of 170° F. or higher. The petcock is opened gradually at the end of this period. The internal temperature of several cans is checked by thermometer, or by turning out the meat for examination. Some meat juice is drawn out of the cans by this method, and the cans must be inspected for proper fill, adding to or taking from them as necessary to leave the proper headspace. Sealing follows without delay.

CODING should be done before processing; i.e., each can stamped with code marks which identify it as belonging to a given lot, of a given kind, on a given date. Coding makes it possible after canning to trace the cans of any lot in

which spoilage occurs. The cold lids may be stamped before sealing. Use a rubber stamp and stamp pad of canners' ink.

SEALING tin cans has proved to be, for many canning centers, the most difficult operation in the canning process. This seems to be due, first to the use of sealing machines too light in construction for the task, and second, to the inexperience of the operators.

On page 13, in table 5, is an estimate of the number and kind, hand or power, of sealing machines required for different quantities of production. Only well built machines will stand the strain of continual use. It is a good practice to have an extra sealing machine in reserve to prevent a tie-up in case one machine gets out of order. The machines should be operated only by competent persons who become familiar with the mechanism.

Some sealing machines have a gauge for testing the adjustment of the seaming rolls. But even then experience is needed to tell when the adjustment is correct.

In a well-made seam the edge of the lid, with the gasket in, is folded smoothly over the flange of the can, then both edges are rolled down tightly against the sides of the can. This gives a hermetic seal. The adjustment of the sealer may be tested frequently during the day by sealing empty cans and filing through the seams with a three-cornered file to expose the folds of the seam.

COOLING. After the processing of tin cans of sizes up to and including No. 2-1/2, the petcock on the pressure cooker may be opened to let the steam escape gradually as the pressure is reduced to zero. For No. 3 cans and larger sizes the pressure should be allowed to come to zero before the petcock is opened. Unless the pressure is reduced very gradually on the larger tin cans, they may buckle, or cave in.

Cool the tin cans at once in running water to a temperature of 100° - 105°F. Only water suitable for drinking should be used for cooling cans with paper gaskets. This is a precaution to avoid contamination.

After the cans are cool examine for leaky seals. When any cans are found to have faulty seals the food should be reprocessed within a few hours or disposed of.

LABELING AND STACKING. Tin cans may be marked with rubber stamps, India ink, or canners' ink, which stands hot water. Use rubber cement to fix paper labels on tin, or if the paper labels are long enough, put glue along one end, wrap smoothly around the cans, and lap the glued end over the other. Labels may be purchased in quantity from jobbing houses or printed to order. (See attached list of manufacturers).

FINAL INSPECTION. After processing, hold all cans at room temperature for 10 days for final examination. Then remove all defective cans, such as leakers and swellers, which must be destroyed.

When considerable quantities of products are being canned it is desirable several times a day to test a representative number of cans for vacuum as a check upon the canning procedure. This may be done with a vacuum gauge which is used to pierce the top of the can and register the vacuum in inches. Vacuum gauges may be obtained from a number of companies selling tin cans. Six to 8 inches of vacuum as measured on the gauge are generally sufficient for most products. If the material has been precooked and packed while hot, a vacuum of 15 to 18 inches may be obtained.

GLASS JARS

In community canning, glass jars may prove useful for the foods that are processed in a water-bath -- fruits, tomatoes and rhubarb -- rather than for the non-acid vegetables and for meats, which require processing in a pressure cooker. It is difficult to avoid loss of liquid from glass jars processed in a pressure cooker. Some of the acid products, moreover, corrode the tin can, and jellies, jams, and preserves, as well as pickles and relishes are commonly put up in glass. (For information on packing pickles, see Farmers' Bulletin No. 1438, "Making fermented pickles".)

EXAMINE glass jars carefully and test seals (except self-sealing type) before using. Use only good quality, tested, new jar rubbers.

WASH the jars thoroughly in soapy water and rinse. Jars used for canning from the open kettle without processing must be sterilized in boiling water before filling and packed while hot. Dip the jar rings in boiling water.

FILLING AND SEALING. Follow the instructions of the manufacturer for the headspace to be left in filling the jars, also adjustments in sealing. Most jars are filled to within 1/2 inch from the top.

TO AVOID LOSS OF LIQUID with glass jars used in a pressure cooker, do not quite complete the seal before processing. The adjustment varies with different kinds of jars and again the manufacturers' directions should be followed. Keep the pressure as constant as possible during processing. Allow the pressure gauge to reach zero before opening the petcock, then open it very gradually so there is no sudden out-rush of steam. Complete the seals on the jars at once. If liquid has been lost do not open the jars to add more, as this will necessitate re-processing.

Exhausting of food in a glass jar takes place during the processing if the jar is not fully sealed.

COOL glass jars in air. Set them apart from each other, but keep them out of drafts. Automatic or self-sealing jars need special protection from drafts after pressure processing; also they should not be inverted until cold.

LABEL glass jars with a glass pencil or with gummed labels.

HANDLING FOODS FOR CANNING

FOODS that are to be canned should be of good quality in every respect, and should be canned as soon as possible after they are gathered. They should be delivered to the canning center early in the day, and in quantities not too large to be taken care of on that day. When foods are held in a warm place, micro-organisms may increase to such an extent that the usual canning processes are inadequate, and spoilage is certain. This has been the cause of numerous failures in community work. If any foods must be held over, separate them into small lots and place in a cool, well-ventilated room, or much better, in a refrigerator.

GRADE the fruits and vegetables as to size and ripeness, in order to obtain uniform products. Since the nonacid vegetables are more difficult to sterilize, they should be canned when small and tender.

WASH FOODS thoroughly to remove all traces of soil.

YIELD OF CANNED PRODUCTS

The yield of canned products from given quantities of raw fruits, vegetables, or meats will vary with conditions of product and with differences in methods or practice. Approximately, however, the yield of canned fruits and vegetables from specified quantities of raw material should be as given below in table 8.

Table 8 - Approximate yield of fruits and vegetables when canned

Fruit or vegetable	Quantity raw	Yield
Apples	2-1/2 pounds	1 No. 3 can (quart)
Berries	1-1/4 to 1-1/2 pounds	"
Cherries	1-1/4 to 1-1/2 "	"
Peaches	2 to 2-1/2 "	"
Pears	2 to 2-1/2 "	"
Plums	1-1/2 to 2 "	"
Tomatoes	2-1/2 to 3-1/2 "	"
Asparagus, whole	3 "	"
Beans, shelled lima	2 "	"
Beans, snap	1-1/2 "	"
Beets, baby	2-1/2 to 3 "	"
Corn	4 to 6 ears	1 No. 2 can
Greens	1 pound	"
Peas, green	4 "	1 No. 3 can
Pumpkin	4 "	"
Sweetpotatoes	2-1/2 to 3 "	"

CANNING BUDGETS

The big canning center, or one that specializes in particular products during an emergency either to save them or to distribute them for relief, can hardly budget its output. But the center that serves its own community, and especially one that utilizes the products of family or community gardens, will find it useful to draw up canning budgets.

This means beginning with a fruit and vegetable budget, showing the amounts a family of given size should consume in a year. Of these requirements, the amount of food to be canned will depend upon how much is used fresh, how much is available for storing fresh, and how much is to be dried or brined. It will depend also upon the length of the growing season, for the canning budget should provide only for the period when fresh fruits and vegetables are out of reach. Many food preservation budgets provide also for canned and cured meats.

Naturally no one budget pattern will fit all localities, and the Extension Services of the various State agricultural colleges have therefore drawn up budget plans based on conditions in their own States. Each canning center should secure these recommendations from the county home demonstration agent or the State Extension Service, and post them in a conspicuous place. The manager of the center should help families unfamiliar with the budget to work out their own budget plans.

In recent years home demonstration clubs and other community groups have made and carried out canning budgets for hot lunches in local schools.

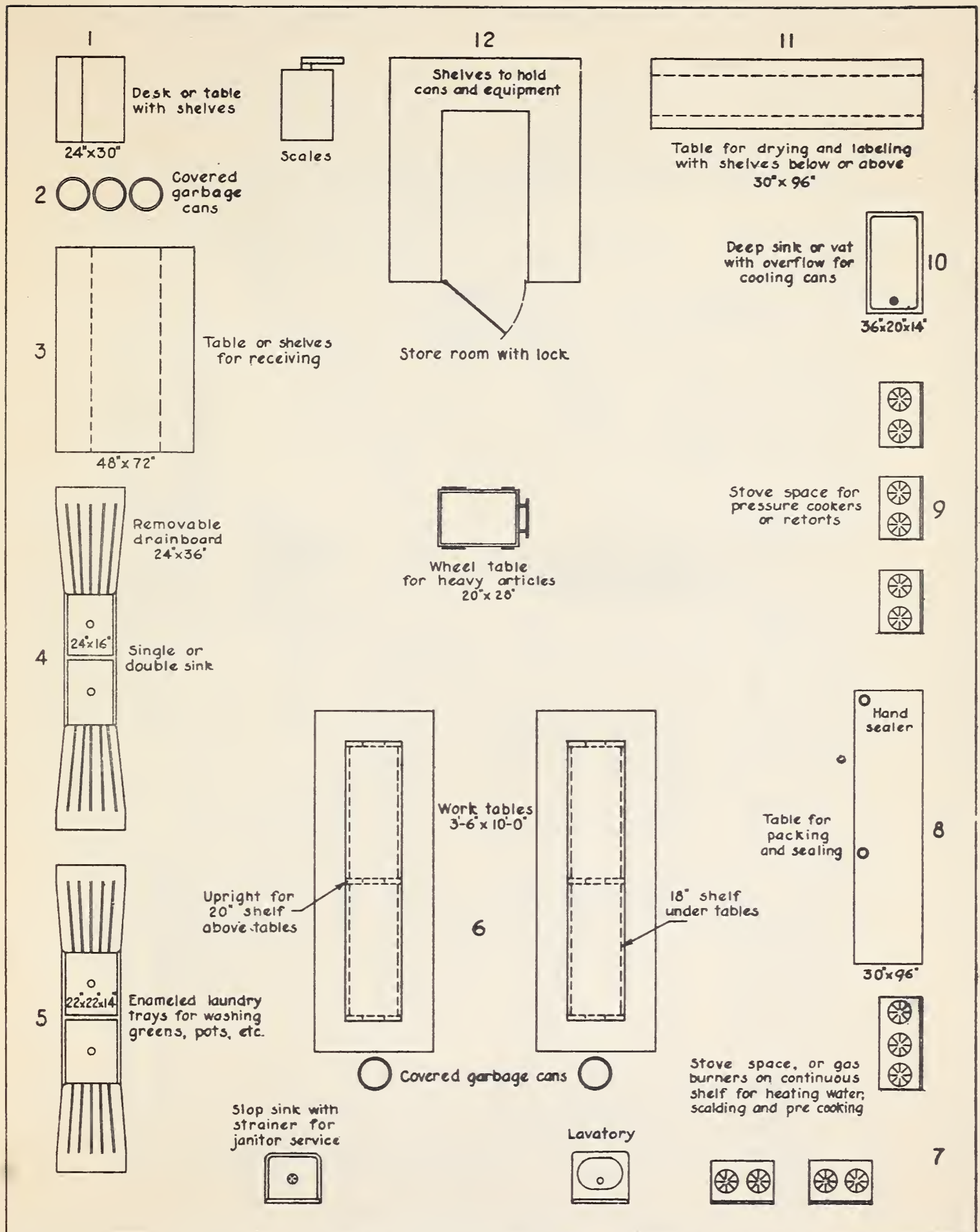
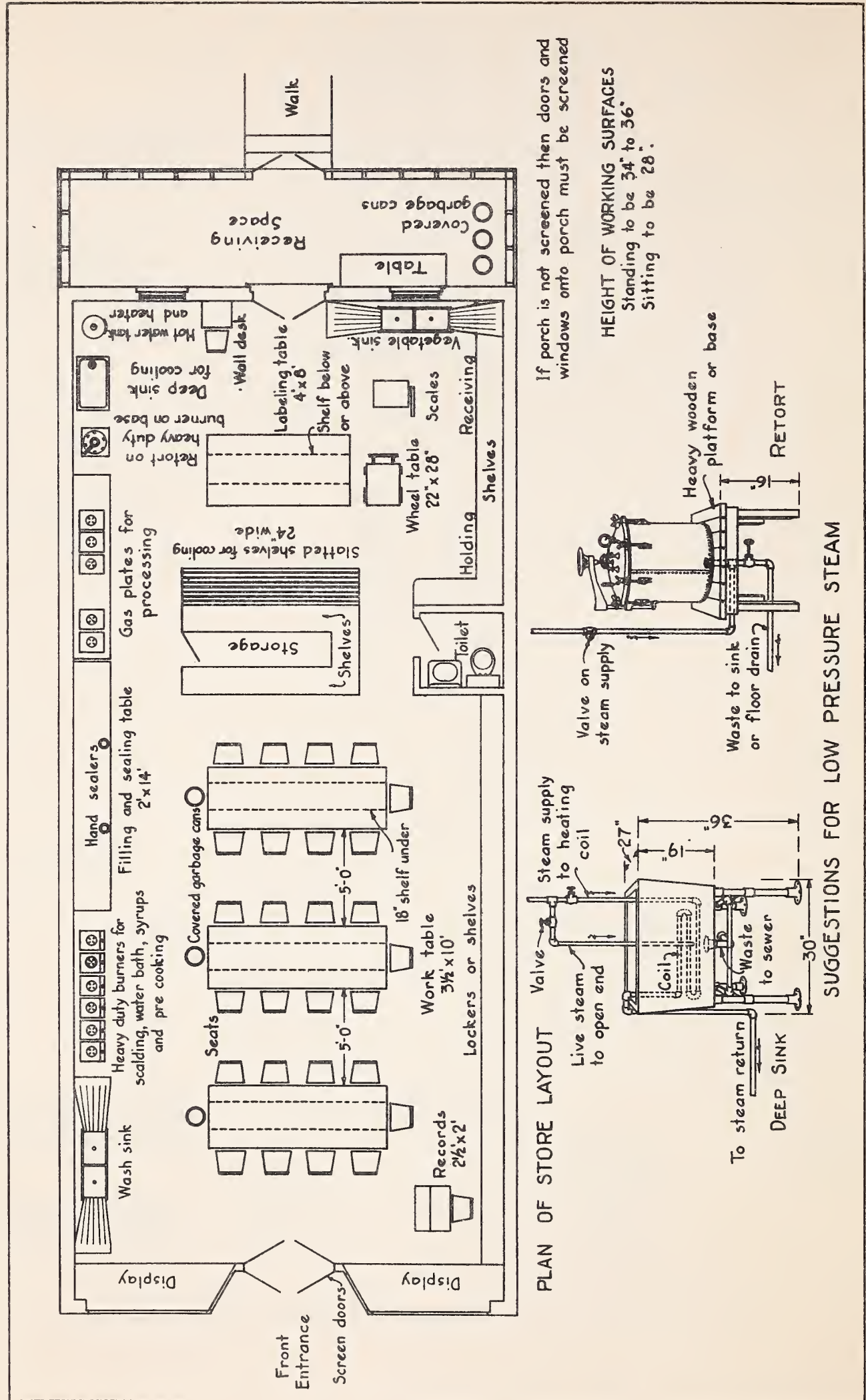


FIG. 1. DIAGRAM OF EQUIPMENT DESIRABLE FOR CANNING CENTER ARRANGED IN CONVENIENT ORDER FOR CANNING OPERATIONS



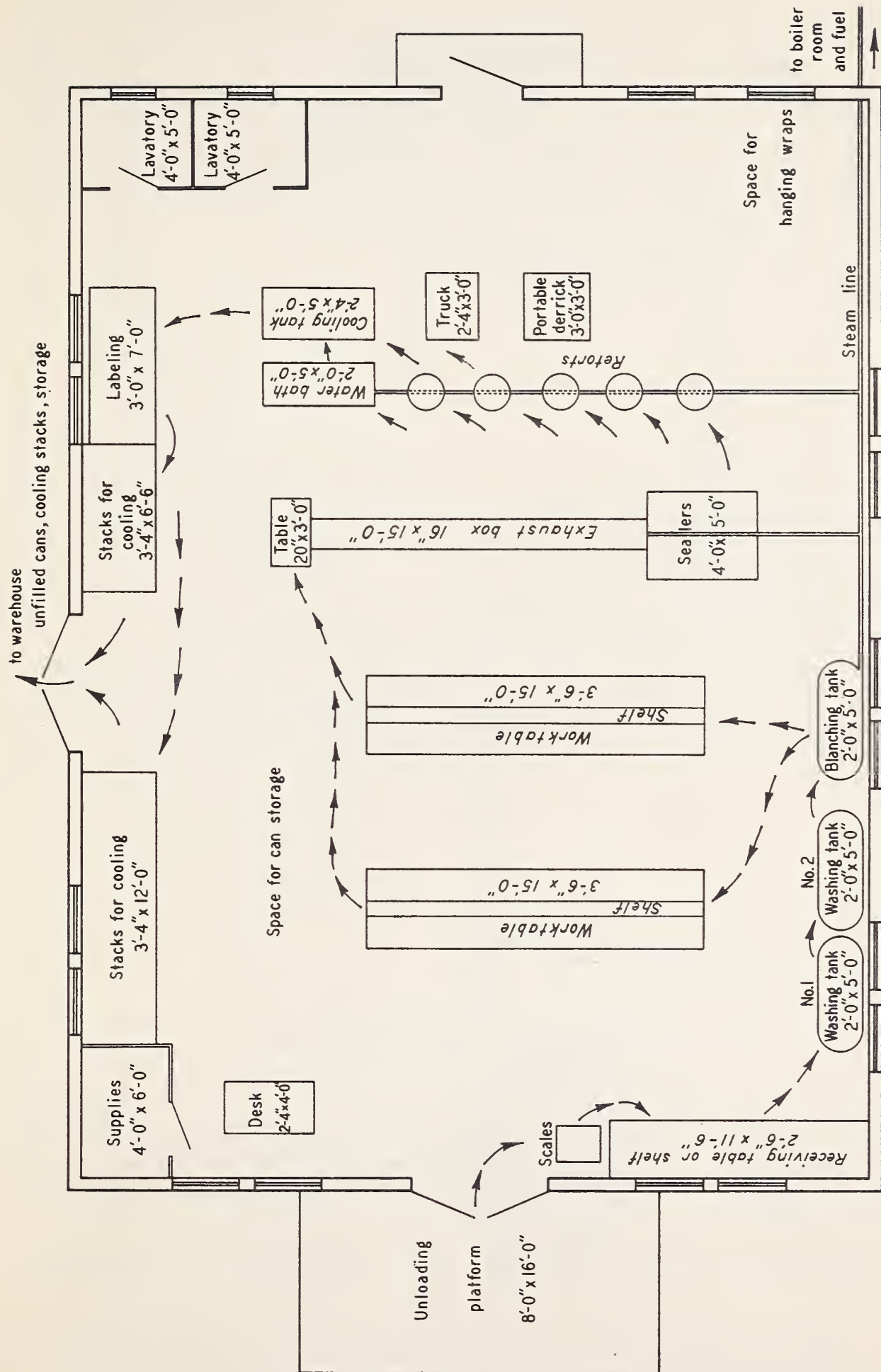


Fig. 3. Suggested floor plan for a canning plant with capacity of 1000 to 2000 cans per day

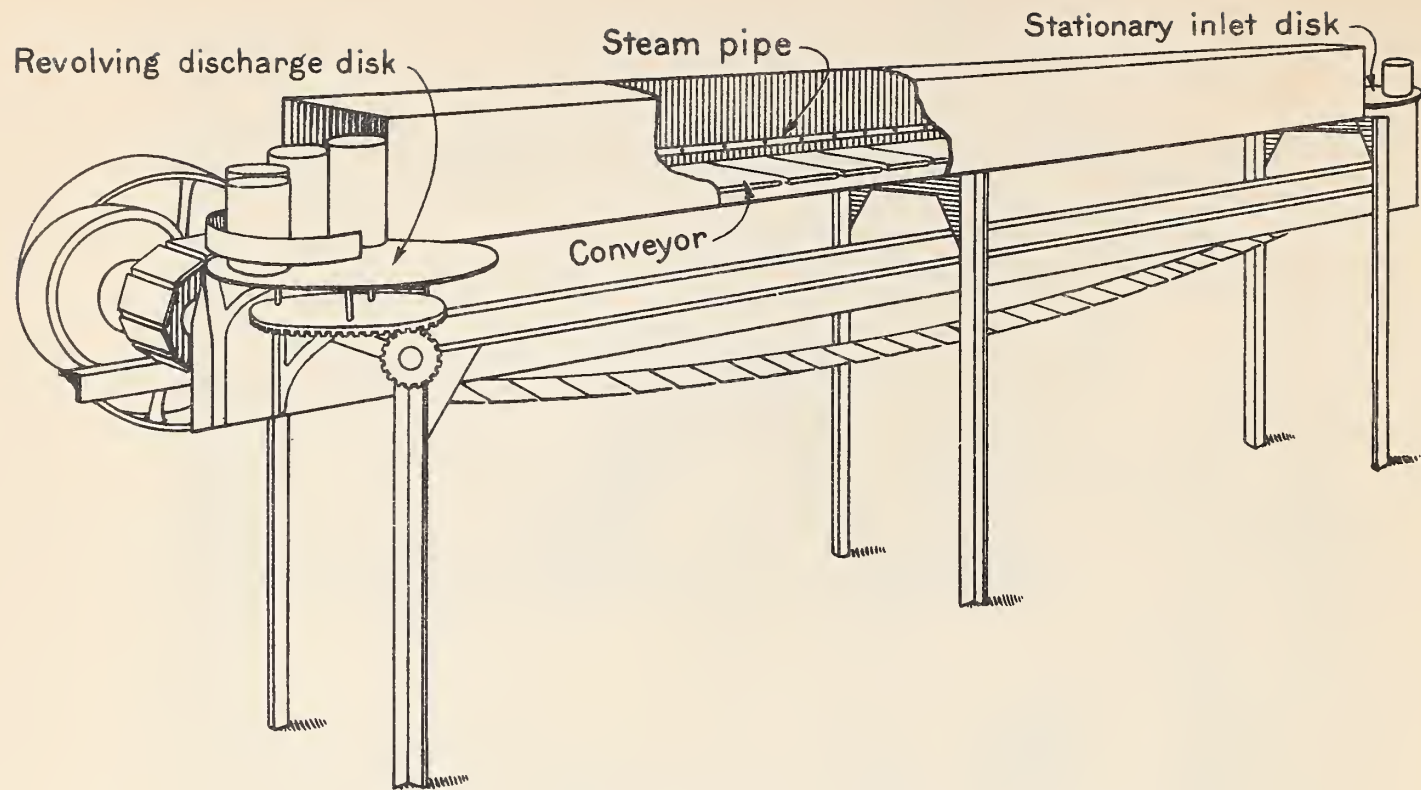


Fig. 4. Design for exhaust box of galvanized iron

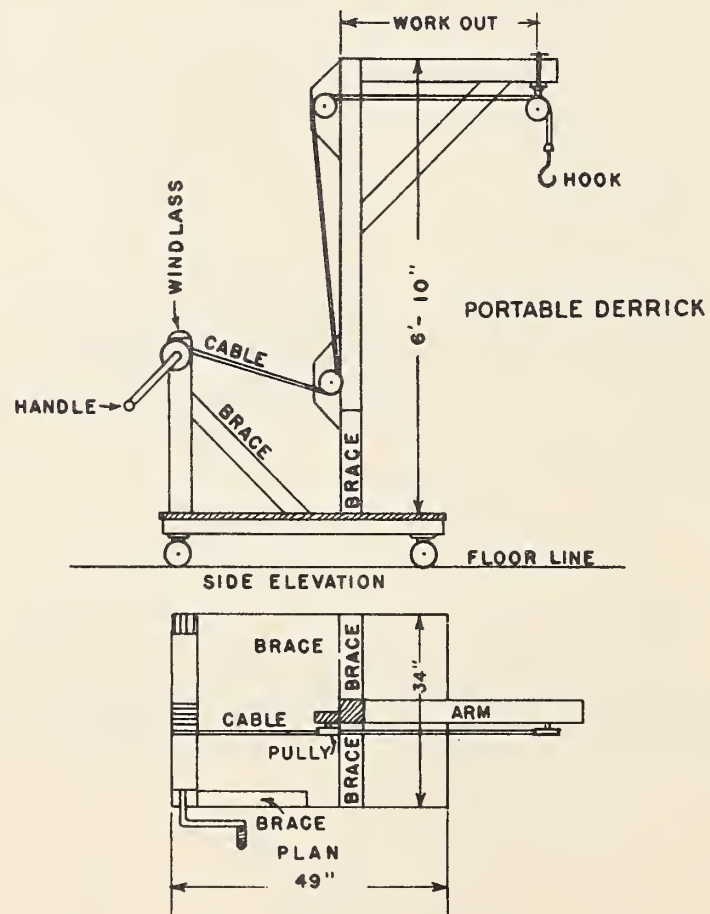


Fig. 5. Design for a portable derrick for use in a canning center

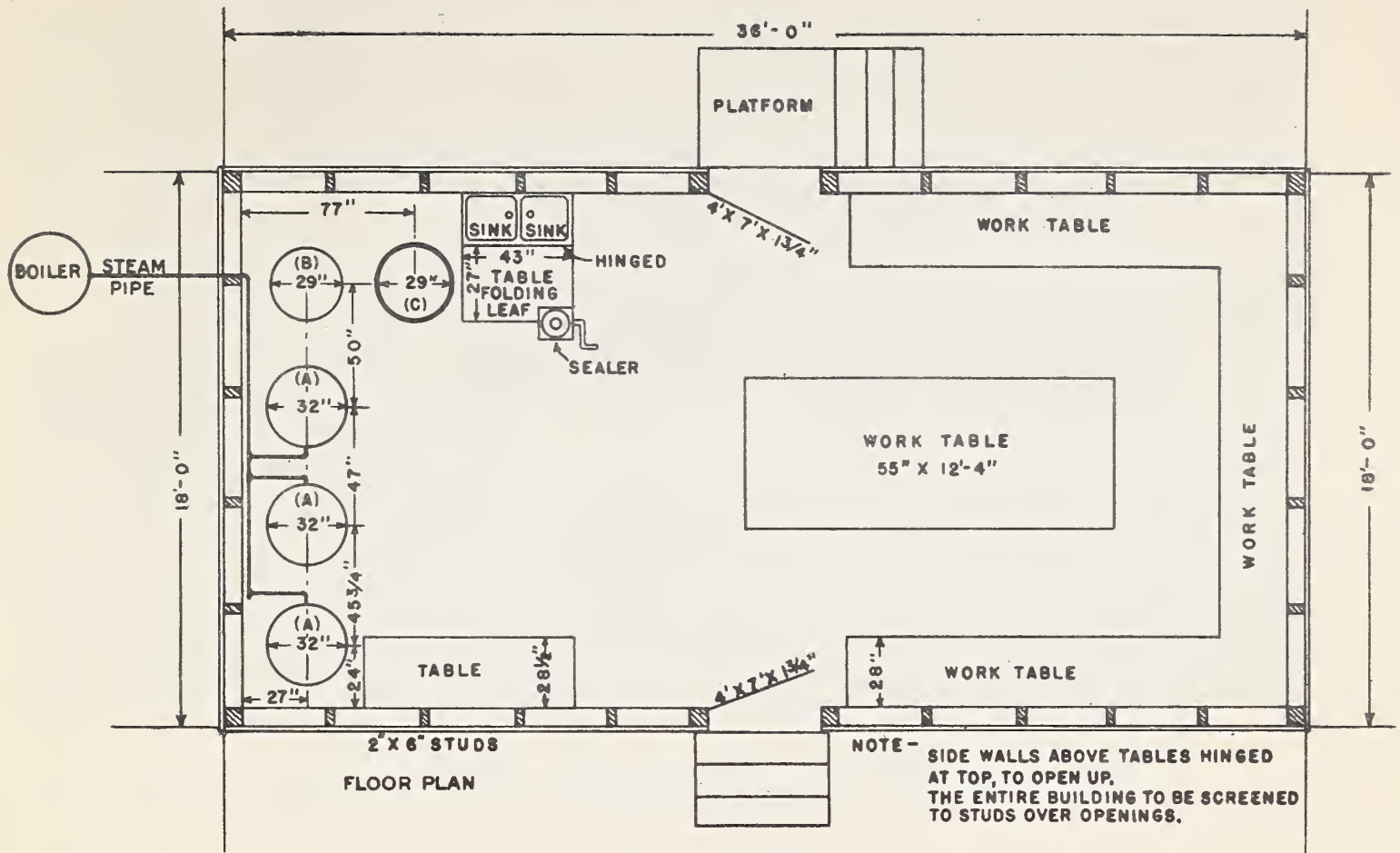


Fig. 6. Floor plan of community canning kitchen at Durham, North Carolina
(A) Water-bath cookers; (B) Retort; (C) Steam jacket kettle

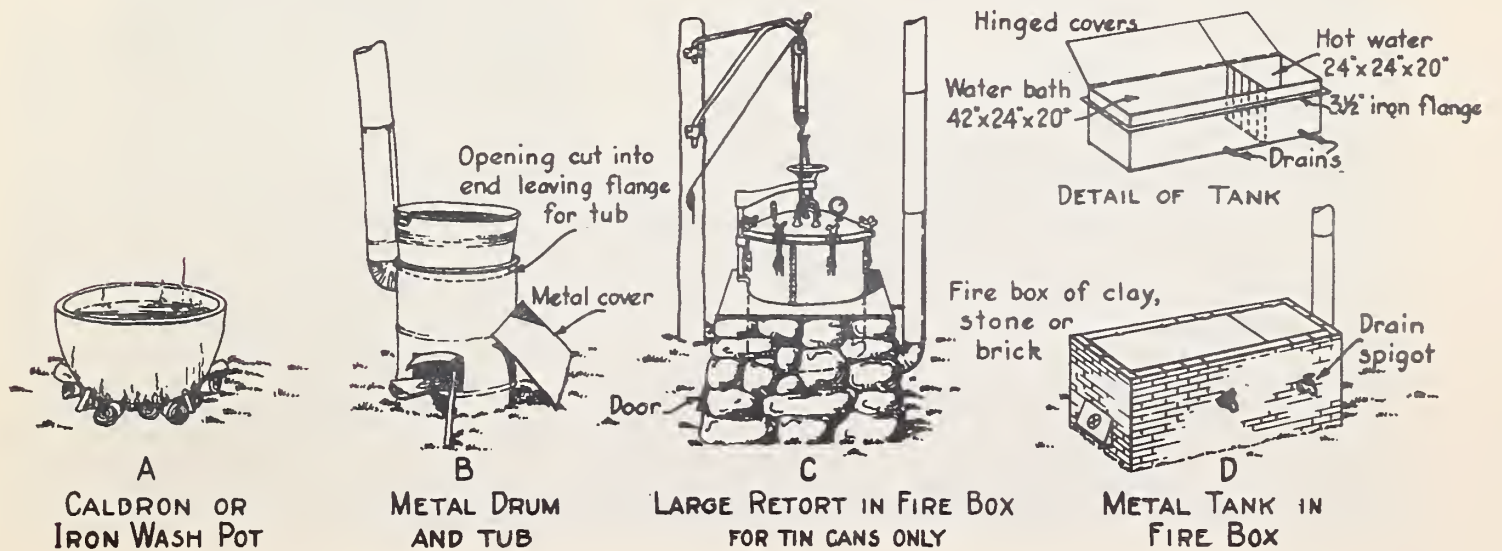
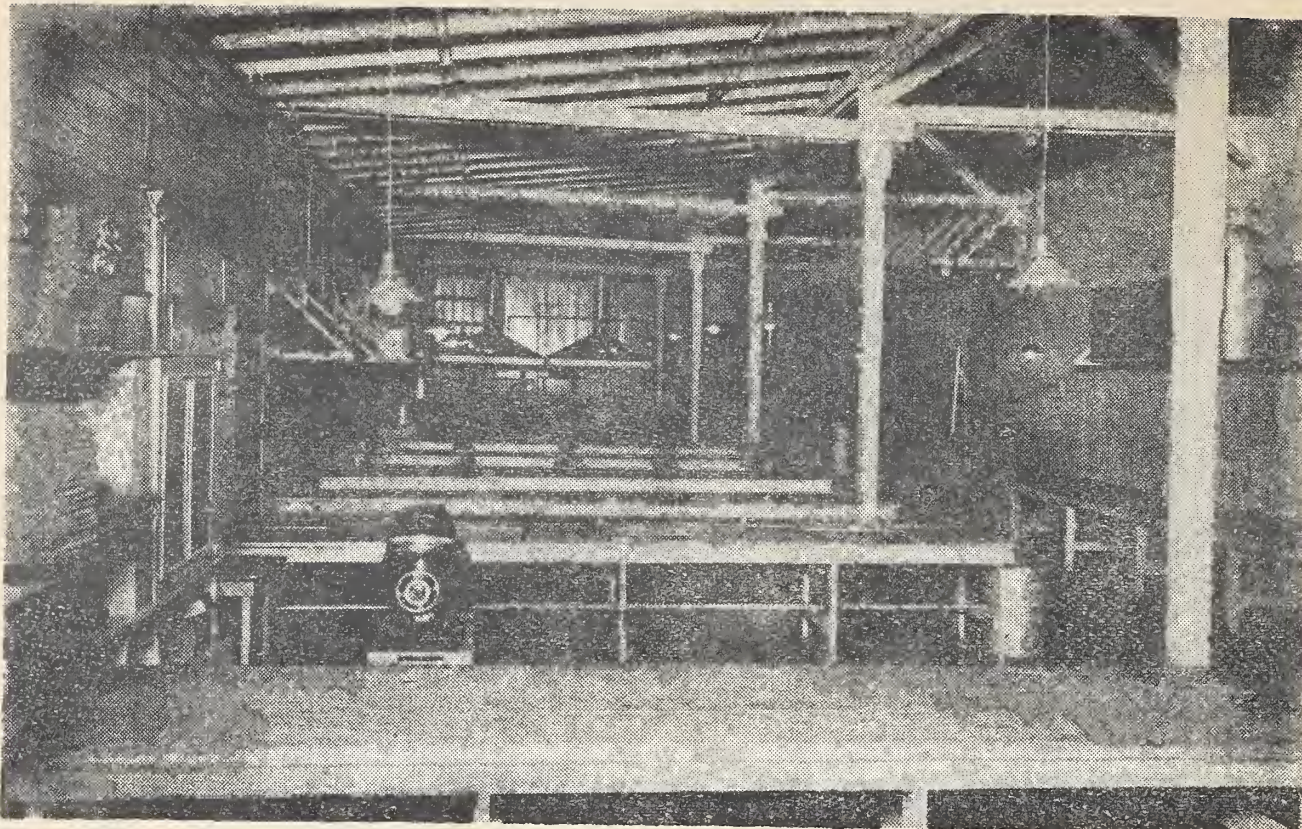


Fig. 7. Improvised outdoor equipment for a community canning center



**Fig. 8. Interior of Federal Relief Canning Plant,
Waco, Texas**



Fig. 9. Portable canning equipment, New Mexico



Fig. 10. Portable canning equipment, Tacoma, Washington

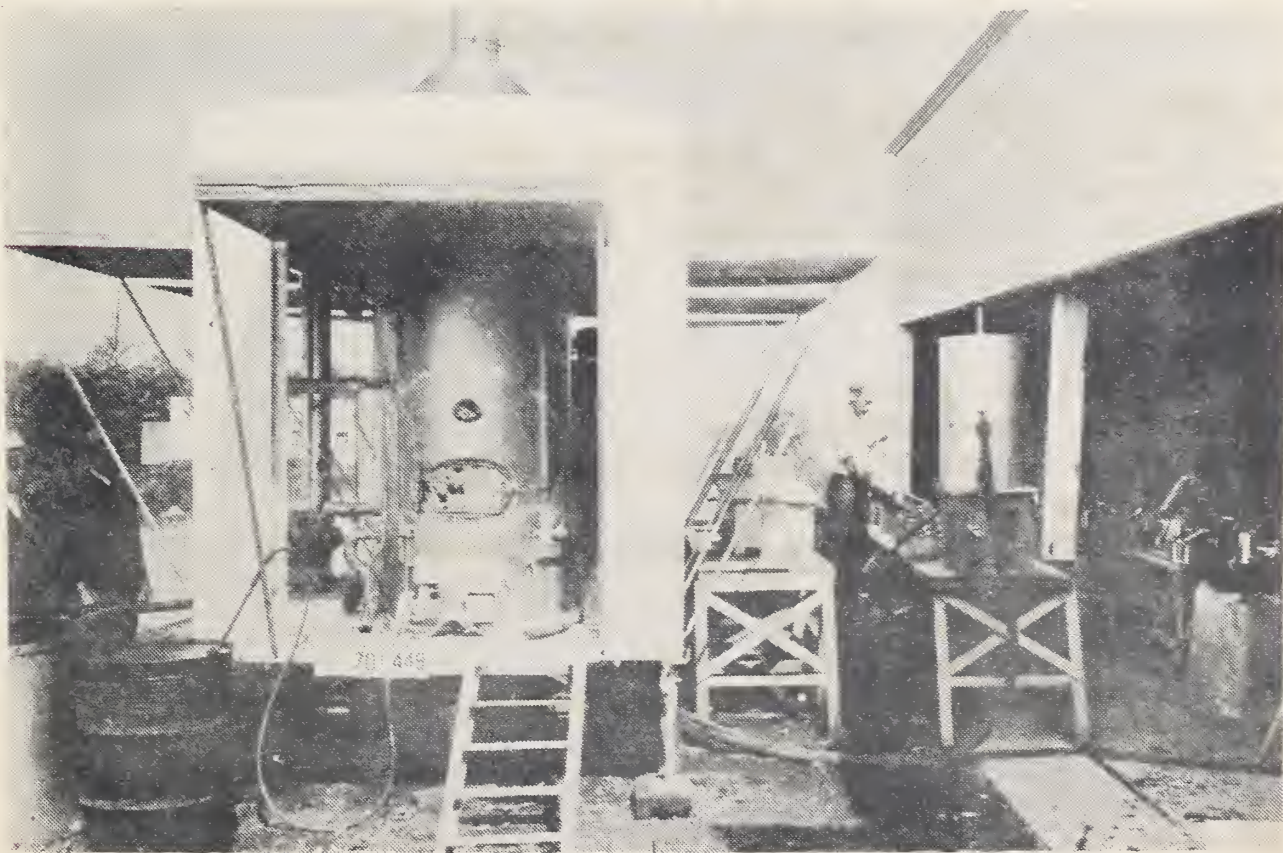


Fig. 11. Portable canning equipment, Tacoma, Washington
Rear end

A PARTIAL LIST OF MANUFACTURERS OF HOME CANNING EQUIPMENT

In giving these names, no guarantee is implied nor should it be inferred that the products of these firms are recommended in any way over those of other firms which may be manufacturing canning equipment.

PRESSURE COOKERS (STEAM)

American Aluminum Ware Co., 370 Jelliff Ave., Newark, N. J.
Automatic Canning Devices, Inc., 222 W. No. Bank Dr., Chicago, Ill.
Burpee Can Sealer Co., 2635 N. Kildare Ave., Chicago, Ill.
Dixie Canner Co., Inc., Little Rock, Ark.
National Aluminum Manufacturing Co., Peoria, Ill.
National Pressure Cooker Co., East Claire, Wis.
Robins, A. K., & Co., Inc., Lombard & Concord St., Baltimore, Md.
Sechrist, Albert, Mfg. Co., 1717 Logan, Denver, Colo.
Sprague-Sells Corp., 101 E. Maple St., Hoopeston, Ill.
The Pressure Cooker Co., 338 Broadway, Denver, Colo.

LARGE-SCALE CANNING EQUIPMENT

Ams, Max, Machine Co., City Line, Bridgeport, Conn.
Anderson-Barngrover Mfg. Co., San Jose, Cal.
Ayars Machine Co., North Salem, N. J.
Berlin Chapman Co., Berlin, Wis.
Columbia Canning Machy. & Supply Co., 2439 N. W. 29th, Portland, Ore.
Robins, A. K., & Co., Inc., Lombard & Concord Sts., Baltimore, Md.
Sprague-Sells Corp., 101 E. Maple St., Hoopeston, Ill.

WATER BATHS, RACKS, JAR HOLDERS, ETC.

Hamblin & Russell Mfg. Co., Inc., Worcester, Mass.
Kerr Wire Products Co., 319 N. Whipple St., Chicago, Ill.
Rochester Can Co., 109 Hague, Rochester, N. Y.
Stahl, F. S., Mfg. Co., Quincy, Ill.

GLASS JARS

Ball Bros. Co., Muncie, Ind.
Capstan Glass Co., Connellsville, Pa.
Cupples Co., 7th & W. Corner Spruce, St. Louis, Mo.
Foster-Forbes Glass Co., Marion, Ind.
Glass Container, Inc., 3601 Santa Fe Ave., Los Angeles, Cal.
Hazel-Atlas Glass Co., Wheeling, W. Va.
Hocking Glass Co., Lancaster, Ohio
Kerr Glass Mfg. Corp., Sand Springs, Okla.
Owens-Illinois Pacific Coast Co., 15th and Folsom, San Francisco, Cal.
Salem Glass Works, West Salem, N. J.

RUBBER RINGS

Acme Rubber Mfg. Co., Trenton, N. J.
Ball Bros. Co., Muncie, Ind.
Boston Woven Hose and Rubber Co., Cambridge, Mass.
Cupples Co., 7th and W. Corner Spruce, St. Louis, Mo.
Goodrich, B. F., Rubber Co., 450 S. Main St., Akron, Ohio.
Jenkins Bros., 514 Main St., Bridgeport, Conn.
United States Rubber Co., 1792 Broadway, Passaic, N. J.

CAPS FOR GLASS JARS AND BOTTLES

American Can Co., 11th Ave. and St. Charles Rd., Maywood, Ill.
Anchor Cap and Closure Corp., Queens and Summit St., Long Island City, N.Y.
Ball Bros. Co., Muncie, Ind.
Bernardin Bottle Cap Co., Evansville, Ind.
Phoenix Metal Cap Co., 2444 W. 16th St., Chicago, Ill.
Real Seal Cap Co., 2419 W. 14th St., Chicago, Ill.
Standard Crown Co., Hartlane & Emerald, Philadelphia, Pa.

TIN CANS

Acme Can Corp. Ltd., Los Angeles, Cal.
American Can Co., 11th Ave. and St. Charles Rd., Maywood, Ill.
Atlas Can Co., 241 Wythe Ave., Brooklyn, N. Y.
*Automatic Canning Devices, Inc., 222 W. No. Bank Dr., Chicago, Ill.
*Burpee Can Sealer Co., 2635 N. Kildare Ave., Chicago, Ill.
Continental Can Co., Inc., 4633 W. Grand Ave., Chicago, Ill.
*Dixie Canner Co., Inc., Little Rock, Ark.
Eagle Can Co., 356 Mystic Ave., Somerville, Mass.
Heckin Can Co., 435 New, Cincinnati, Ohio.
Independent Can Co., Howard and Ostend Sts., Baltimore, Md.
Metal Package Corp., 110 E. 42nd St., New York City.
National Can Co., 71 Locust St., Boston, Mass.
Pacific Can Co., 290 Division, San Francisco, Cal.
Phillips Can Co., Cambridge, Md.
Southwestern Can Co., Houston, Texas.
Western Can Co., 17th and Rhode Island St., San Francisco, Cal.

SEALERS FOR TIN CANS

Ams, Max, Machine Co., City Line, Bridgeport, Conn.
Automatic Canning Devices, Inc., 222 W. No. Bank Dr., Chicago, Ill.
Burpee Can Sealer Co., 2635 N. Kildare Ave., Chicago, Ill.
Dixie Canner Co., Inc., Little Rock, Ark.
National Pressure Cooker Co., Eau Claire, Wis.
Robins, A. K., & Co., Inc., Lombard & Concord Sts., Baltimore, Md.
Sprague-Sells Corp., 101 E. Maple St., Hoopeston, Ill.

JELLY GLASSES

Ball Bros Co., Muncie, Ind.
Capstan Glass Co., Connellsville, Pa.
Hazel-Atlas Glass Co., Wheeling, W. Va.
Kerr Glass Mfg. Corp., Sand Springs, Okla.
Owens-Illinois Pacific Coast Co., 15th & Folsom, San Francisco, Cal.
Salem Glass Works, West Salem, N. J.

CANNERS LABELS

Colorprint Label Co., 125 S. 4th St., St. Louis, Mo.
Dixie Canner Co., Inc., Little Rock, Ark.
Fuller Label & Box Co., 444 Dargan, Pittsburgh, Pa.
Higgins & Gollmar, Inc., 38 Ferry St., New York, N. Y.
Kalamazoo Label Co., 200 Ransom St., Kalamazoo, Mich.
R. J. Kittredge & Co., 812 W. Superior, Chicago, Ill.
Maryland Color Printing Co., Holliday & Hillen, Baltimore, Md.
United States Printing & Lithograph Co., 2 Beech St., Cincinnati, Ohio.

*These companies sell in small lots to home canners.

